IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Backes Application No.: 10/781121 Filed: 02/18/2004 Title: Program for Selecting an Optimum Access Point in a Wireless Network Attorney Docket No.: 160-031	Group Art Unit: 2665 Examiner: Philpott

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APPELLANT'S BRIEF PURSUANT TO 37 C.F.R. § 1.192

This Appellant's brief is submitted in accordance with the Notice of Appeal filed with this brief.

I. Real Party in Interest

The real party in interest is AutoCell Laboratories, Inc.

II. Related Appeals and Interferences

Appellants are not aware of any appeals or interferences that are related to the present case.

III. Status of the Claims

Claims 1-11 are pending in this application. All of the pending claims were rejected in the Final Office Action dated October 18, 2006. No claims have been allowed. The rejection of independent claim 1 is the subject of this appeal. The current state of the claims is shown in Appendix A.

IV. Status of Amendments

An amendment was filed August 2, 2006, in which claims 1 through 5 and 11 were amended. That Amendment was entered by the Examiner and considered in the preparation of the Final Office Action dated October 18, 2006.

V. Summary of Claimed Subject Matter

The subject matter of claim 1 is a program product for controlling how a station ("STA") selects an access point ("AP") with which to attempt to become associated. The terms "station" and "access point" are well known in the networking art. A station is a mobile wireless terminal device such as a PDA, cell phone or notebook computer.

Access points are fixed location devices which provide network access to stations. In particular, a station obtains network access through a first access point with which it is associated, and may migrate to a second access point by dis-associating with the first access point and associating with the second access point. The program product in claim 1 executes logic steps including associating the wireless device with a current access point on a first channel, ascertaining whether to attempt to associate with an alternative access point based on signal strengths of transmissions from the alternative access point and technology type employed by the alternative access point, and requesting association with the alternative access point if it is ascertained that the wireless device should attempt to associate with said alternative access point.

The claimed method is described in the Specification at pp. 43-59 in section "3 STA Initialization" and section "4 STA Optimization," including other sections referenced in section 3. Support for the limitation "logic for associating the wireless device with a current access point on a first channel" is at page 43 in the text describing Figure 23, and also in section 4. Support for the limitation "logic for ascertaining, by the wireless device, whether the wireless device should attempt to associate with an alternative access point operating on a second channel, the ascertaining logic utilizing, at least in-part, signal strengths of transmissions from the alternative access point, and technology type employed by the alternative access point" is in the descriptions of "canvassing" and "bidding" on page 44, and at pages 51-52 where calculation of distance (in Banzais) and calculation of data rate as a function of signal strength and technology type are described. Support for the limitation "logic for requesting association with the

alternative access point if it is ascertained that the wireless device should attempt to associate with said alternative access point" is on page 44 in the description of "bidding."

Since the Examiner previously asserted that the limitation of using technology type to evaluate whether an alternative access point is better than the current access point lacked support in the Specification, a detailed description of the support is repeated below. The Specification states that "the notion of what constitutes a better AP takes into account the distance in Banzais, the available data rate, and the loading."[1] Available data rate is calculated as a function of signal strength and technology type. In particular, "the data rate is deduced based on the received signal strength and the technology being used (i.e., in an 802.11 environment, the 802.11 mode of operation (a, b, g))."[2] The specification then describes that "in an 802.11 environment, the distance and 802.11 mode (a, b, g) are used to retrieve the expected data rate for the STA 16 from the distance_to_rate table," an example of which is shown in Table II in Figure 31.[3] The algorithms for performing calculations are listed at the bottom of page 53, and at page 54, line 5. Therefore, the Specification explicitly teaches that (1) technology type is used to determine whether the alternative AP is better; and (2) the term "technology" refers to 802.11 modes and analogous protocols. Further, a specific example is illustrated in Table II in Figure 31.

[1] page 51, lines 1-2
[2] page 52, lines 4-6
[3] page 53, line 19 through page 54, line 2

VI. Grounds of Rejection to be Reviewed on Appeal

Claim 1 was rejected under 35 U.S.C. 103(a) over U.S. Patent Application Publication No. US 2003/0036374 ("English"), in view of U.S. Patent No. 6,144,855 ("Slovin")

VII. Argument

A. The combination of English and Slovin fails to teach using technology type to evaluate whether an alternative AP is better than the current AP as recited in claim 1.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

The meaning of the term "technology type" is clear from the Specification, and is known in the wireless networking art. As already discussed, the Specification describes use of IEEE 802.11 technology types 802.11a, 802.11b and 802.11g with signal strength to deduced based data rate.[4] As one example of use in the art, document 1 of Appendix B, "IETF RFC 4065 / RFC4065" lists the IEEE 802.x technologies at section 5.2. Similarly, document 2 of Appendix B, "WindowsXP - Choosing the type of network to install" states:

[4] page 52, lines 4-6

The full list of wireless technologies includes:

- **802.11b.** This is the oldest and most compatible wireless technology, and any wireless network device can connect to an 802.11b network. 802.11b is slow, however, and you should use it only for browsing the Web, sending instant messages, and reading e-mail.
- **802.11g.** The best choice for new wireless networks, 802.11g works with any device that supports 802.11b, while offering five times the performance. 802.11g is fast enough to stream music and some video (but not high-definition video).
- **802.11n.** A future standard that will replace 802.11g and 802.11b networks, while still supporting existing wireless computers. 802.11n can offer better range and performance than 802.11g; however, 802.11n network equipment is more expensive, and most wireless devices do not support it.
- **Other 100+ Mbps wireless technologies.** Most network vendors (or manufacturers) now offer custom wireless equipment that claims speeds higher than 100 Mbps. In the real world, performance is only slightly better than that provided by 802.11g and, in order to realize the benefit, you have to use wireless network adapters from the same vendor in each of the devices you're connecting. These devices also support 802.11b and 802.11g, however, and are a good choice if the price is comparable to 802.11g equipment.
- **802.11a.** This is an outdated wireless technology that offers good performance but is compatible with only a few devices.

Similarly, document 3 in Appendix B, "INTEL, PRO/Wireless 3945ABG Network Connection, IEEE 802.11a/b/g, 11/54Mbps, PCIe Mini Card" states in the Ease-of-Use and Manageability section "For example, all available networks, along with their corresponding signal strength, **technology type**, network name, and security status is displayed on the main screen." (emphasis added). Therefore, the meaning of the term "technology type" is understood in the art.

With regard to the limitation "logic for ascertaining, by the wireless device, whether the wireless device should attempt to associate with an alternative access point operating on a second channel, the ascertaining logic utilizing, at least in-part, signal strengths of transmissions from the alternative access point, and technology type employed by the alternative access point," the Examiner Office suggests that English teaches this at paragraphs 0145, 0149-0159, and 0164-0167. However, paragraph 0145 simply states that English can operate with any type of wideband technology. Paragraphs 0149-0159 simply discuss advantages of impulse radio signals. With regard to use of "technology," Paragraphs 0164-0167 simply state that the APs communicate with one another using traditional communication technology. Therefore, even assuming the term "technology" was intended by English to have the same meaning as it is currently used in the art, and as used in claim 1, English still fails to teach using technology type to **evaluate whether an alternative AP is better than the current AP**.

If an independent claim is non-obvious under 35 U.S.C. 103, then any claim depending therefrom is non-obvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Accordingly, claims 2-11 also distinguish the cited combination.

VIII. Conclusion

Appellants submit that the rejections of the present claims under 35 U.S.C. 103 are improper for at least the reasons set forth above. Appellants accordingly request that the rejections be withdrawn and the case put forward for allowance.

Respectfully submitted,

DateNovember 16, 2006

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Docket No. 160-056

Appendix A - Claims

1. (previously presented) A program product for use by a wireless device in a wireless communications environment, the program product comprising a computer readable medium having embodied therein a computer program for storing data, the computer program comprising:

logic for associating the wireless device with a current access point on a first channel;

logic for ascertaining, by the wireless device, whether the wireless device should attempt to associate with an alternative access point operating on a second channel, the ascertaining logic utilizing, at least in-part, signal strengths of transmissions from the alternative access point, and technology type employed by the alternative access point; and

logic for requesting association with the alternative access point if it is ascertained that the wireless device should attempt to associate with said alternative access point.

2. (previously presented) The program product of claim 1 further comprising:

logic for automatically collecting, by the wireless device, information about access points operating on other channels, including indications of transmit power backoff.

3. (previously presented) The program product of claim 2 wherein the logic for ascertaining obtains an indication of expected data rate of service by the alternative

access point, and ascertains that the wireless device should attempt to associate with the alternative access point operating on said second channel if the alternative access point on said second channel has a greater expected data rate than an actual data rate provided by the current access point .

4. (previously presented) The program product of claim 3 wherein the logic for ascertaining ascertains by:

calculating a first biased distance between the wireless device and the current access point based on "x" samples;

calculating a second biased distance between the wireless device and the alternative access point operating on said second channel based on "y" samples where "y" is less than "x"; and

ascertaining that the alternative access point operating on said second channel is closer than the current access point if the second biased distance is less than the first biased distance.

5. (previously presented) The program product of claim 3 wherein the logic for requesting association requests association by sending a bid message to the alternative access point operating on said second channel prior to disassociating from the current access point.

6. (withdrawn) A program product for use by a wireless device in a wireless communications environment, the program product comprising:

logic operable for associating the wireless device with a first access point on a first channel;

logic operable for determining, by the wireless, whether a second access point would provide a better data rate than the first access point; and

logic operable for requesting, by the wireless device, association with the second access point if it is determined that the second access point would provide a greater data rate than the first access point.

7. (withdrawn) The program product of claim 6 wherein the second access point operates on the first channel.

8. (withdrawn) The program product of claim 6 wherein the second access point operates on a second channel.

9. (withdrawn) The program product of claim 6 wherein the determining logic utilizes, at least in-part, signal strength of transmissions from the first and second access points.

10. (withdrawn) The program product of claim 6 wherein the determining logic utilizes, at least in-part, an indication of loading advertised by the first and second access points.

11. (previously presented) The program product of claim 1 wherein the alternative access point is operating at a purposefully attenuated transmission signal strength, and wherein the ascertaining logic also employs maximum potential signal strength of the

alternative access point for ascertaining whether the wireless device should attempt to associate with the alternative access point.

Appendix B - Evidence Submitted

Document 1: IETF RFC 4065 / RFC4065

Document 2: WindowsXP - Choosing the type of network to install

Document 3: INTEL, PRO/Wireless 3945ABG Network Connection, IEEE 802.11a/b/g, 11/54Mbps, PCIe Mini Card

Appendix C - Related Proceedings

None.

The RFC Archive - RFC 4065 RFC-ARCHIVE.ORG

RFC Archive HOME | RFC Standards - 1 | RFC Standards - 2 | Best Current Practice | New RFCs | 1 April RFC

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Instructions for Seamoby and Experimental Mobility Protocol IANA Allocations

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Network Working Group
Request for Comments: 4065
Category: Experimental

J. Kempf
DoCoMo Labs USA
July 2005

Instructions for Seamoby and
Experimental Mobility Protocol IANA Allocations

Status of This Memo

This memo defines an Experimental Protocol for the Internet community. It does not specify an Internet standard of any kind. Discussion and suggestions for improvement are requested. Distribution of this memo is unlimited.

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Abstract

The Seamoby Candidate Access Router Discovery (CARD) protocol and the Context Transfer Protocol (CXTP) are experimental protocols designed to accelerate IP handover between wireless access routers. These protocols require IANA allocations for ICMP type and options, Stream Control Transmission Protocol (SCTP) Payload Protocol Identifiers, port numbers, and registries for certain formatted message options. This document contains instructions to IANA about which allocations are required for the Seamoby protocols. The ICMP subtype extension format for Seamoby has been additionally designed so that it can be utilized by other experimental mobility protocols, and the SCTP port number is also available for other experimental mobility protocols.

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1. Introduction

The Seamoby Candidate Access Router Discovery (CARD) protocol [RFC 4066] and the Context Transfer Protocol (CXTP) [RFC 4067] are experimental protocols designed to accelerate IP handover between wireless access routers. These protocols require IANA allocations for ICMP options and type, SCTP Payload Protocol Identifiers, port numbers, and the establishment of registries for certain formatted message options. Because the protocols are experimental, there is no guarantee that they will ever see widespread deployment in their current form. Consequently, it is prudent to conserve Internet numbering resources that might be needed for other protocols that could see wider deployment. This document contains instructions to IANA for the Seamoby protocols. Additionally, the ICMP subtype extension format has been designed so that it could be used by other experimental mobility protocols.

The key words **"MUST"**, **"MUST NOT"**, **"REQUIRED"**, **"SHALL"**, **"SHALL NOT"**, **"SHOULD"**, **"SHOULD NOT"**, **"RECOMMENDED"**, **"MAY"**, and **"OPTIONAL"** in this document are to be interpreted as described in RFC 2119 [RFC 2119]. Allocation policy names Specification Required, IETF Consensus Action, and Designated Expert are to be interpreted as described in RFC 2434 [RFC 2434].

2. Common IPv4 and IPv6 Allocations

IANA has assigned SCTP port numbers 5090 for use by [RFC 4066] and 5091 for use of [RFC 4067]. See Section 5.2.1 of [RFC 4066] for a description of the inter-access router CARD protocol use of SCTP, and Section 3.1 of [RFC 4067] for a description of the inter-access router CXTP use of SCTP.

3. IPv4 Allocations

IANA has assigned ICMP type 41 for IPv4 identifying ICMP messages utilized by experimental mobility protocols such as Seamoby. See Section 5.1.1 of [RFC 4066] for a description of experimental mobility CARD ICMP messages and Section 3.2 of [RFC 4067] for the CXTP ICMP messages, specified by Seamoby. See Section 9 of this document for a description of the experimental mobility protocol ICMP subtype format and initial allocations.

IANA has assigned Mobile IPv4 Foreign Agent Discovery [RFC 3344] option type codes for the following:

Code	Purpose	Reference
137	CARD MN-AR signature option	Section 6.4 of [RFC 4066]
138	CARD Request option	Section 5.1.2.1 of [RFC 4066]
139	CARD Reply option	Section 5.1.2.2 of [RFC 4066]

4. IPv6 Allocations

IANA has assigned ICMP type code 150 for IPv6 identifying ICMP messages utilized by experimental mobility protocols such as Seamoby. See Section 5.1.1 of [RFC 4066] for a description of experimental mobility CARD ICMP messages and Section 3.2 of [RFC 4067] for the CXTP ICMP messages, specified by Seamoby. See Section 9 of this document for a description of the experimental mobility protocol subtype format and initial allocations.

IANA has assigned IPv6 RFC 2461 Neighbor Discovery [RFC 2461] option type codes for the following:

Code	Purpose	Reference
138	CARD Request option	Section 5.1.2.1 of [RFC 4066]
139	CARD Reply option	Section 5.1.2.2 of [RFC 4066]

5. Candidate Access Router Discovery Protocol Registries

For CARD, two new registries are created that IANA is to maintain, named:

1) The AVP Type Registry,
2) The Layer 2 Access Technology Identifier Registry.

These are described in the following subsections.

5.1. AVP Type Registry

The AVP Type Registry allows for future expansion of the CARD AVP type space to include new AVPs. AVP Type codes are 16 bit unsigned integers. See Section 5.1.4 of [RFC 4066] for a description of AVPs.

The registry **SHALL** be initially populated with the following table:

AVP Name	Type Code
RESERVED	0x00

Future allocations of AVP type codes will be made through Expert Review, as defined in RFC 2434.

5.2. Layer 2 Access Technology Identifier Registry

The Layer 2 Access Technology Identifier registry allows the registration of type codes to uniquely identify specific access technologies in the L2-Type field of the CARD L2 ID sub-option. L2 ID codes are 16 bit unsigned integers. See Section 5.1.3.1 of [RFC 4066] for a description of the CARD L2 ID sub-option.

The registry **SHALL** initially be populated with the following table:

Layer 2 Access Technology	Type Code
RESERVED	0x00
IEEE 802.3 (Ethernet)	0x01
IEEE 802.11a	0x02
IEEE 802.11b	0x03
IEEE 802.11g	0x04
IEEE 802.15.1(Bluetooth)	0x05
IEEE 802.15.3	0x06
IEEE 802.15.4	0x07
IEEE 802.16	0x08

Future allocation of Layer 2 Access Technology identifiers will be made by the method of Specification Required, as defined in RFC 2434. All requests for allocations **MUST** be accompanied by a reference to a technical document in which the design of the Layer 2 access technology is described.

6. Context Transfer Profile Type Registry

CXTP requires IANA to maintain a registry named the Context Transfer Profile Type Registry, which is a registry of context Feature Profile Type identifiers. Feature Profile Type identifiers are 16 bit unsigned integers that identify particular types of feature contexts. See Section 2.4 of [RFC 4067] for a description of how contexts are carried in CXTP.

The registry **SHALL** initially be populated with the following table:

Context Profile	Type Code
RESERVED	0x00
IPv6 Multicast Listener Context	0x01

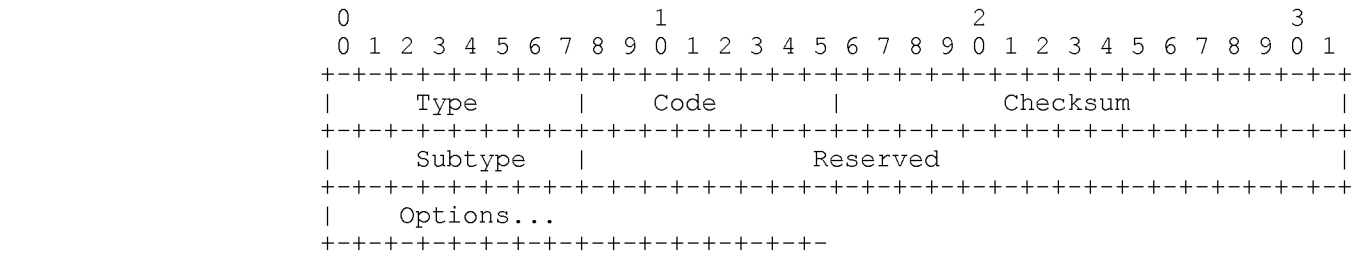
Future allocations of Feature Profile Type codes will be made through Expert Review, as defined in RFC 2434.

7. Context Transfer Protocol Authorization Token Calculation Algorithm

In Section 2.5.4 of [RFC 4067], CXTP requires an authorization token calculation algorithm indicator. Currently, the only indicator defined is 0x1, for HMAC_SHA1. Additional algorithms may be added by the method of Specification Required [RFC 2434].

8. ICMP Experimental Mobility Subtype Format and Registry

The ICMP Experimental Mobility Type is utilized by CARD and CXTP in the following way. The interpretation of the Code field is as defined by the relevant ICMP standard for IPv4 and IPv6, and does not change. The protocols are free to utilize the Code for their own purposes. The ICMP Experimental Mobility Type defines a one octet subtype field within the ICMP Reserved field that identifies the specific protocol. The ICMP header for the Experimental Mobility Type is:



Type For IPv4, 41; for IPv6 150

Code As defined by the relevant ICMP specification and free for use by the Experimental Mobility protocol.

Checksum ICMP checksum

Subtype One octet subtype code identifying the Experimental Mobility protocol

Reserved Unless otherwise defined by the Experimental Mobility protocol, set to zero by the sender and ignored by the receiver.

Options As defined by the Experimental Mobility protocol.

IANA **SHALL** maintain a registry of one octet unsigned integer subtype codes for the Experimental Mobility protocols called the Experimental Mobility Protocol Subtype Registry.

Initial allocations in the registry **SHALL** be established as follows:

Protocol/Message	Subtype	Reference
CARD	0	Section 5.1.1 of [RFC 4066]
CXTP	1	Section 3.2 of [RFC 4067]

Subsequent allocations of subtype codes **SHALL** be made by the method of Specification Required and IESG Review as defined in RFC 2434.

9. Usage by Other Experimental Mobility Protocols

The ICMP Experimental Mobility type code is available for other experimental mobility protocols to use. Other experimental mobility protocols **MAY** define additional ICMP messages that use code points under the Experimental Mobility ICMP type.

10. Normative References

[RFC 2434] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 2434, October 1998.

[RFC 2461] Narten, T., Nordmark, E., and W. Simpson, "Neighbor Discovery for IP Version 6 (IPv6)", RFC 2461, December 1998.

[RFC 3344] Perkins, C., "IP Mobility Support for IPv4", RFC 3344, August 2002.

[RFC 4066] Liebsch, M., Ed., Singh, A., Ed., Chaskar, H., Funato, D., and E. Shim, "Candidate Access Router Discovery (CARD)", RFC 4066, July 2005.

[RFC 4067] Loughney, J., Ed., Nahkjiri, M., Perkins, C., and R. Koodli, "Context Transfer Protocol", RFC 4067, July 2005.

11. Security Considerations

There are no security considerations associated with this document.

12. IANA Considerations

This entire document is about IANA considerations.

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Acknowledgement

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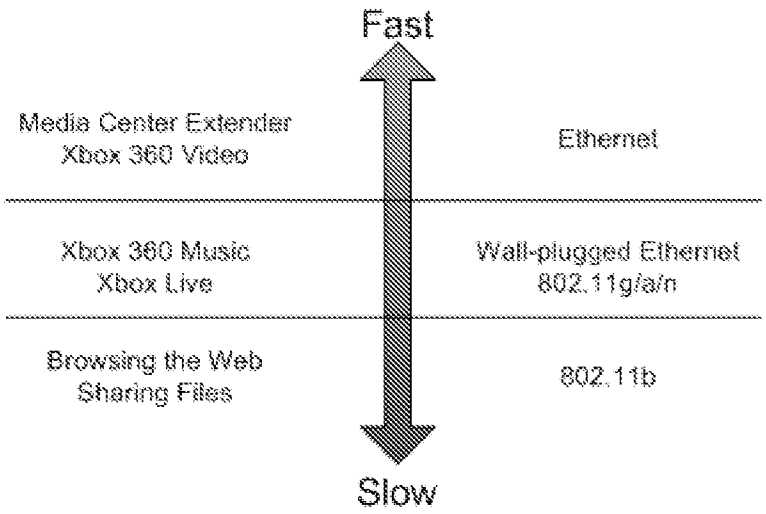
Choosing the type of network to install

Published: August 15, 2006

Every year, more people add Internet access to their home computers. And it's no wonder. You need to stay up-to-date with the news, keep in touch with friends and family members, and communicate with the office. If you're in school, you can send instant messages to classmates, collaborate on projects, and conduct research.

Using the Internet at home means you need a home network (even if you're just linking a single PC to the Internet). Home networks can be easy to set up, but first you have to make a decision: wired or wireless? Whichever you choose, and depending upon how you will use your home network, you might need to choose a specific network type.



Wired networks

Wired networks, also known as Ethernet networks, connect your computer to your Internet connection with a cable that looks like a thick phone wire. Wired networks are highly reliable, very secure, extremely fast, and easy to set up. They're also the least expensive type of network. You should use a wired network whenever it's practical. Wired networks also offer better reliability for high-quality video than wireless networks do.

Wired networks do have a drawback, however: the wires. Wires can be messy, and you may need to hire an electrician if the computer you are using is in a different room than the one with the Internet connection. Installing a network connection port requires an electrician. (A network connection port looks like a large version of the port you use to plug in your telephone.)

Network cables, also known as Ethernet or "Cat 5" cables, can be up to 300 feet long. However, you probably don't want cables running across your floors. If you have a computer in a different room from your Internet connection and want to connect it to the Internet, you can extend your wired network across your home's power lines using a wall-plugged network extender kit. When choosing a network extender kit, opt for the fastest speed available.

With network extender kits, network speeds (known as bandwidth) vary according to your home's wiring. Typically, extenders provide about one-third the speed of a standard wired network. That's fast enough to browse the Web, listen to music across your network, play Internet games, and even watch video (as long as it's not high-definition video).

If you decide a wired network is right for you, here's how to set it up.

⇧ Top of page

Wireless networks

Wired networks are the best choice for connecting desktop computers and stationary devices (such as Xbox 360 and digital video recorders). But the Internet is even more fun to use when you're not tied to one spot. Laptops, Tablet PCs, and many pocket PCs can connect to wireless networks, such as 802.11b and 802.11g, giving you the freedom to use the Internet in your living room, kitchen, backyard, or anywhere around your home.

Adding a wireless network also enables you to use a wide variety of cool devices:

- **Wireless video cameras.** Monitor any room in your home from across the Internet—even if you don't have a computer in that room.
- **Wireless digital cameras.** Take pictures and instantly upload them to your computer—without having to connect your camera to your computer.
- **Wireless digital multimedia receivers.** Connect your TV and stereo to your computer across your wireless network. Listen to your digital music, watch a digital slideshow, and even watch videos.

While wired networks are reliable and relatively easy to set up, wireless networks can be more complex. For the easiest installation, use Windows XP with Service Pack 2 and a wireless access point that supports Windows Connect Now technology.

Note: Hardware vendors (or manufacturers) claim wired and wireless networks have particular bandwidth capacities. Deciphering this information can be confusing. In

general, higher is always better. When you're comparing wireless bandwidth to wired bandwidth, divide what the vendor claims the wireless bandwidth will be by 4. For example, 802.11b wireless networks claim to have 11 megabits per second (Mbps) of bandwidth. Yet they typically achieve less than 3 Mbps, which might not be enough to take full advantage of your broadband Internet connection. If a wireless access point claims it is 54 Mbps, you can expect to get about 18 Mbps of throughput. Wall-plugged network extenders similarly exaggerate bandwidth. Wired networks that don't use extenders get about two-thirds of their claimed bandwidth. The most common network, 100-Base-T, gets about 60 to 70 Mbps bandwidth.

You can choose from several different wireless technologies. If the following list seems overwhelming, don't worry—just buy 802.11g networking equipment. The full list of wireless technologies includes:

- **802.11b.** This is the oldest and most compatible wireless technology, and any wireless network device can connect to an 802.11b network. 802.11b is slow, however, and you should use it only for browsing the Web, sending instant messages, and reading e-mail.
- **802.11g.** The best choice for new wireless networks, 802.11g works with any device that supports 802.11b, while offering five times the performance. 802.11g is fast enough to stream music and some video (but not high-definition video).
- **802.11n.** A future standard that will replace 802.11g and 802.11b networks, while still supporting existing wireless computers. 802.11n can offer better range and performance than 802.11g; however, 802.11n network equipment is more expensive, and most wireless devices do not support it.
- **Other 100+ Mbps wireless technologies.** Most network vendors (or manufacturers) now offer custom wireless equipment that claims speeds higher than 100 Mbps. In the real world, performance is only slightly better than that provided by 802.11g and, in order to realize the benefit, you have to use wireless network adapters from the same vendor in each of the devices you're connecting. These devices also support 802.11b and 802.11g, however, and are a good choice if the price is comparable to 802.11g equipment.
- **802.11a.** This is an outdated wireless technology that offers good performance but is compatible with only a few devices.

Wireless performance varies, depending on the size of your home, the types of walls you have, the type of wireless phones you have, and even the wireless networks that your neighbors may have. If you have poor performance in part of your home, read these tips.

Once you choose a wireless router, you can set up your wireless network.

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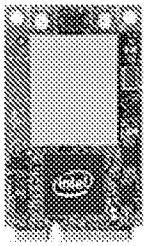
Microsoft

Intel® PRO/Wireless Network Connection

Intel® PRO/Wireless 3945ABG Network Connection (Tri-mode 802.11a/b/g)
Intel® PRO/Wireless 2915ABG Network Connection (Tri-mode 802.11a/b/g)
Intel® PRO/Wireless 2200BG Network Connection (Dual mode 802.11b/g)



The Intel® PRO/Wireless Network Connection is the integrated Wireless LAN (WLAN) solution for Intel® Centrino® mobile technology and desktop personal computers. The Intel PRO/Wireless Network Connection provides freedom and flexibility to work and play without hunting for a phone jack, network cable, or plugging in a special card. Get connected through wireless LAN networks in your home, in the office, and in wireless LAN hotspots in airports, hotels and coffee shops. +

Deploying WLAN technology in your home and business increases productivity, efficiency and flexibility by enabling faster decision making, reducing down-time, and enhancing employee satisfaction. For more information visit our WLAN ROI and WLAN Deployment web pages.

Resources

How to Guide: Setup your WLAN

Cisco Intel Alliance

VoIP

Intel® PROSet Wireless Web Demo (SWF 3MB)

Related Products

Intel® PROSet/Wireless Software

Intel® Centrino® Duo Mobile Technology

Choice of Products

Dual and Tri-Mode Solutions

The Intel® PRO/Wireless network connection provides deployment flexibility and connectivity convenience by offering a choice of products including a dual mode (supporting 802.11b/g), and a tri-mode (supporting 802.11a/b/g) product.

Ease-of-Use and Manageability

Intel® PROSet/Wireless Software is an advanced wireless client that is designed for usability. It includes an intuitive user interface where, at a glance, the user is provided an overview of the WLAN environment. For example, all available networks, along with their corresponding signal strength, technology type, network name, and security status is displayed on the main screen. In addition, users can see all of their profiles and can import/export profiles between systems. Intel® PROSet ◇ software enables a superior mobile experience for consumers and enterprise users by providing:

Intel® Smart Wireless Solutions support including:
Security Assistant - simplifies WLAN security configuration
Wireless Troubleshooter - assists users with WLAN connectivity and captures events for troubleshooting

Save profiles that allow users to automatically connect and securely switch between networks

IT Administrator Tool - enabling network managers to remotely manage and update wireless settings on clients

Centralized Profile Management simplifies IT profile distribution

Single Sign On support enabling a single set of credentials to authenticate the user to both WLAN network and the machine/domain

Wake on WLAN - allows remote wake up of mobile clients to perform software updates

EAP-SIM support allowing one-bill roaming between cellular networks and supported WLAN hotspots

Network Robustness

As enterprises continue to deploy and invest in WLAN infrastructure, Intel is helping enable additional usage models and functionality that will put their WLAN investment to even greater use. Business Class Wireless Suite, a collaboration between Intel and Cisco, provides integrated wireless LAN solutions to enable new applications and higher performance for businesses when using Intel® PRO/Wireless 3945ABG Network Connection and Cisco* Unified Wireless Architecture. New capabilities include Enhanced VoIP Quality Technology and Optimal AP Selection Technology. In addition, Noise Interference Filter enhances performance especially in areas with wireless signal overlap.

Security

Intel Centrino mobile technology supports the latest industry standards enabling safer notebook connectivity. It also provides third-party security enhancement support for Cisco* Compatible Extensions (such as LEAP, EAP-FAST and CKIP.)§ With a PC manufacturers' certification, this feature enables interoperability with Cisco* Unified Wireless Architecture and other Cisco* compatible validated products.§

Performance

With throughput up to 54 Mbps at 5 GHz (802.11a) and 2.4 GHz (802.11g), the Intel® PRO/Wireless network connection family enables fast network connections. The Intel® Wireless Coexistence System helps reduce interference with certain Bluetooth* devices. Power Save Protocol (PSP) is a user selectable feature with five different power states, allowing the user to make their own power versus performance choice when in battery mode. For more information about the wireless LAN performance of Intel Centrino mobile technology read our Performance White Paper or review the technical specifications in our product briefs.

Great Battery Life

The Intel® PRO/Wireless network supports the great battery life benefits of Intel Centrino mobile technology. Intel® Intelligent Scanning Technology reduces power by controlling the frequency of scanning for access points.

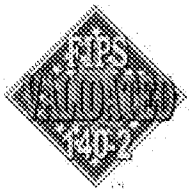
Verification

Intel Centrino mobile technology is being verified with leading VPN infrastructure products. Intel is working with hardware and software developers and wireless service providers to deliver a reliable and integrated wireless mobile computing experience.

Features and Benefits

	Intel® PRO/Wireless 3945ABG Network Connection (Tri-mode 802.11a/b/g)	**Intel® PRO/Wireless 2915ABG Network Connection (Tri-mode 802.11a/b/g)**	**Intel® PRO/Wireless 2200BG Network Connection (Dual mode 802.11b/g)**
Wi-Fi CERTIFIED*^	Wi-Fi CERTIFIED* for 2.4 GHz and 5 GHz band, WPA* and WPA2*		Wi-Fi CERTIFIED* for single band, 2.4 GHz band, Wi-Fi Protected Access (WPA) and WPA2*

Operating Frequency	5 GHz UNII: Orthogonal Frequency Division Multiplexing (OFDM)[∞] for 802.11a 2.4 GHz ISM: Direct Sequence Spread Spectrum (DSSS) for 802.11b 2.4 GHz ISM: Orthogonal Frequency Division (OFDM) for 802.11g	2.4GHz ISM: Direct Sequence Spread Spectrum (DSSS) for 802.11b 2.4 GHz ISM: Orthogonal Frequency Division (OFDM) for 802.11g
Performance	Typical indoor range of 40 ft (12 m) @ 54 Mbps / 300 ft (91 m) @ 6 Mbps for 802.11a, 100 ft (30 m) @ 11 Mbps / 300 ft (90 m) @ 1 Mbps for 802.11b, 100 ft (30 m) @ 54 Mbps / 300 ft (91 m) @ 1 Mbps for 802.11g Intel® Wireless Coexistence System support enables reduced interference between Intel PRO/Wireless & certain Bluetooth* devices. For systems designed with two antennas, real-time antenna selection enables optimized WLAN performance. Real-time temperature calibration dynamically optimizes wireless performance by adjusting output power to temperature changes for increased throughput & range with 802.11a radio.[∞]	Typical indoor range of 100 ft (30 m) @ 54 Mbps / 300 ft (91 m) @ 1 Mbps for 802.11g and 100 ft (30 m) @ 11 Mbps / 300 ft (90 m) @ 1 Mbps for 802.11b Intel® Wireless Coexistence System support enables reduced interference between Intel PRO/Wireless & certain Bluetooth* devices. For systems designed with two antennas, real-time antenna selection enables optimized WLAN performance. Real-time temperature calibration dynamically optimizes wireless performance by adjusting output power to temperature changes for increased throughput & range with 802.11a radio.[∞]
Intel® PROSet Software[◇]	Business Class Wireless Suite with Enhanced VoIP Quality Technology and Optimal AP Selection Technology Cisco Compatible Extensions v4 Wake on WLAN	Cisco Compatible Extensions v3
Intel® PROSet Software[◇]	Easy-to-use interface with Intel® Smart Wireless Solutions support IT Administrator Tool with Single Sign On support, Centralized Profile Management and Install Package Creator EAP-SIM support	
Power Management	Intel® Intelligent Scanning Technology reduces power by controlling the frequency of scanning for access points A user selectable feature with five different Power states, which allows the user to make their own power vs. performance choices when in battery mode	
The Intel PRO/Wireless network connection is a Wi-Fi CERTIFIED*^ product.		Intel® PRO/Wireless 2915ABG Network Connection and Intel® PRO/Wireless 2200BG Network Connection are FIPS validated with the 3eTI supplicant enabled solution.



FIPS 140-2 Inside

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+ Wireless connectivity and some features may require you to purchase additional software, services or external hardware. Availability of public wireless LAN access points is limited, wireless functionality may vary by country and some hotspots may not support Linux-based Intel Centrino mobile technology systems. System performance measured by MobileMark*. System performance, battery life, wireless performance and functionality will vary depending on your specific operating system, hardware and software configurations. See www.intel.com/products/centrino/ for more information.

ˆ Wireless functionality may vary by country and Wi-Fi certification is not supported on Linux-based Intel Centrino mobile technology laptops. Check with your PC manufacturer for details. Other names and brands may be claimed as the property of their respective owners.

◇ Intel® PROSet/Wireless Software v10.5 supports PCS and Intel Centrino mobile technology based notebooks with Intel® PRO/Wireless 3945ABG Network Connection, Intel® PRO/Wireless 2200BG Network Connection and Intel® PRO/Wireless 2915ABG Network Connection. The software may not be supported by your PC's operating system and/or by your PC manufacturer. Some features may require specific hardware configurations. Check with your PC manufacturer for details.

§ Some security solutions may not be supported by your PC's operating system and may require additional software and/or certain hardware as well as wireless LAN infrastructure support. Check with your PC manufacturer for details.

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